

SEQUENCE LISTING

5 (1) GENERAL INFORMATION:

(i) APPLICANT: GEFTER, Malcolm L. et al.

10 (ii) TITLE OF INVENTION: A HUMAN T CELL REACTIVE FELINE PROTEIN
(TFRP)
ISOLATED FROM HOUSE DUST AND USES THEREFOR

(iii) NUMBER OF SEQUENCES: 93

15 (iv) CORRESPONDENCE ADDRESS:

(A) ADDRESSEE: IMMULOGIC PHARMACEUTICAL CORPORATION
(B) STREET: 610 LINCOLN STREET
(C) CITY: WALTHAM
(D) STATE: Massachusetts
20 (E) COUNTRY: USA
(F) ZIP: 02145

(v) COMPUTER READABLE FORM:

(A) MEDIUM TYPE: Floppy disk
(B) COMPUTER: IBM PC compatible
(C) OPERATING SYSTEM: PC-DOS/MS-DOS
(D) SOFTWARE: ASCII text

25 (vi) CURRENT APPLICATION DATA:

(A) APPLICATION NUMBER:
(B) FILING DATE:
(C) CLASSIFICATION:

30 (vii) PRIOR APPLICATION DATA:

(A) APPLICATION NUMBER: 07/807,529
(B) FILING DATE: December 13, 1991
(C) CLASSIFICATION:

35 (viii) ATTORNEY/AGENT INFORMATION:

(A) NAME: DARLENE A. VANSTONE
(B) REGISTRATION NUMBER: 35,729
(C) REFERENCE/DOCKET NUMBER: 002.6 US

40 (ix) TELECOMMUNICATION INFORMATION:

(A) TELEPHONE: (617) 466-6000
(B) TELEFAX: (617) 466-6040

50 (2) INFORMATION FOR SEQ ID NO:1:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 418 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
55 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

60 (ix) FEATURE:

(A) NAME/KEY: CDS
(B) LOCATION: 2..283

65 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

C TGC ATC ATG AAG GGG GCT CGT GTT CTC GTG CTT CTC TGG GCT GCC
46

Cys Ile Met Lys Gly Ala Arg Val Leu Val Leu Leu Trp Ala Ala
1 5 10 15

5 TTG CTC TTG ATC TGG GGT GGA AAT TGT GAA ATT TGC CCA GCC GTG AAG
94 Leu Leu Leu Ile Trp Gly Gly Asn Cys Glu Ile Cys Pro Ala Val Lys
20 25 30

10 AGG GAT GTT GAC CTA TTC CTG ACG GGA ACC CCC GAC GAA TAT GTT GAG
142 Arg Asp Val Asp Leu Phe Leu Thr Gly Thr Pro Asp Glu Tyr Val Glu
35 40 45

15 CAA GTG GCA CAA TAC AAA GCA CTA CCT GTA GTA TTG GAA AAT GCC AGA
190 Gln Val Ala Gln Tyr Lys Ala Leu Pro Val Val Leu Glu Asn Ala Arg
50 55 60

20 ATA CTG AAG AAC TGC GTT GAT GCA AAA ATG ACA GAA GAG GAT AAG GAG
238 Ile Leu Lys Asn Cys Val Asp Ala Lys Met Thr Glu Glu Asp Lys Glu
65 70 75

25 AAT GCT CTC AGC TTG CTG GAC AAA ATA TAC ACA AGT CCT CTG TGT
283 Asn Ala Leu Ser Leu Leu Asp Lys Ile Tyr Thr Ser Pro Leu Cys
80 85 90

30 TAAAGGAGCC ATCACTGCCA GGAGCCCTAA GGAGCCACT GAACTGATCA CTAAGTAGTC
343

35 TCAGCAGCCT GCCATGTCCA GGTGTCTTAC TAGAGGATTTC CAGCAATAAA AGCCTGGCAA
403

40 (2) INFORMATION FOR SEQ ID NO:2:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 94 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

45 (ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

50 Cys Ile Met Lys Gly Ala Arg Val Leu Val Leu Leu Trp Ala Ala Leu
1 5 10 15

Leu Leu Ile Trp Gly Gly Asn Cys Glu Ile Cys Pro Ala Val Lys Arg
20 25 30

55 Asp Val Asp Leu Phe Leu Thr Gly Thr Pro Asp Glu Tyr Val Glu Gln
35 40 45

60 Val Ala Gln Tyr Lys Ala Leu Pro Val Val Leu Glu Asn Ala Arg Ile
50 55 60

Leu Lys Asn Cys Val Asp Ala Lys Met Thr Glu Glu Asp Lys Glu Asn
65 70 75 80

65 Ala Leu Ser Leu Leu Asp Lys Ile Tyr Thr Ser Pro Leu Cys
85 90

(2) INFORMATION FOR SEQ ID NO:3:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 420 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

5 (ii) MOLECULE TYPE: cDNA
10

15 (ix) FEATURE:
(A) NAME/KEY: CDS
(B) LOCATION: 2..301

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

G GCC TGG CGG TGC TCC TGG AAA AGG ATG TTA GAC GCA GCC CTC CCA
20 46 Ala Trp Arg Cys Ser Trp Lys Arg Met Leu Asp Ala Ala Leu Pro
1 5 10 15
CCC TGC CCT ACT GTT GCG GCC ACA GCA GAT TGT GAA ATT TGC CCA GCC
25 94 Pro Cys Pro Thr Val Ala Ala Thr Ala Asp Cys Glu Ile Cys Pro Ala
20 25 30
GTG AAG AGG GAT GTT GAC CTA TTC CTG ACG GGA ACC CCC GAC GAA TAT
30 142 Val Lys Arg Asp Val Asp Leu Phe Leu Thr Gly Thr Pro Asp Glu Tyr
35 35 40 45
GTT GAG CAA GTG GCA CAA TAC AAA GCA CTA CCT GTA GTA TTG GAA AAT
35 190 Val Glu Gln Val Ala Gln Tyr Lys Ala Leu Pro Val Val Leu Glu Asn
50 55 60
GCC AGA ATA CTG AAG AAC TGC GTT GAT GCA AAA ATG ACA GAA GAG GAT
40 238 Ala Arg Ile Leu Lys Asn Cys Val Asp Ala Lys Met Thr Glu Glu Asp
65 70 75
AAG GAG AAT GCT CTC AGC TTG CTG GAC AAA ATA TAC ACA AGT CCT CTG
45 286 Lys Glu Asn Ala Leu Ser Leu Leu Asp Lys Ile Tyr Thr Ser Pro Leu
80 85 90 95
TGT TAA AGG AGC CAT CACTGCCAGG AGCCCTAAGG AAGCCACTGA ACTGATCACT
50 341 Cys
55 401
AAGTAGTCTC AGCAGCCTGC CATGTCCAGG TGTCTTACTA GAGGATTCCA GCAATAAAAG
420
60 (2) INFORMATION FOR SEQ ID NO:4:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 100 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

5 Ala Trp Arg Cys Ser Trp Lys Arg Met Leu Asp Ala Ala Leu Pro Pro
1 5 10 15
Cys Pro Thr Val Ala Ala Thr Ala Asp Cys Glu Ile Cys Pro Ala Val
20 25 30
10 Lys Arg Asp Val Asp Leu Phe Leu Thr Gly Thr Pro Asp Glu Tyr Val
35 40 45
15 Glu Gln Val Ala Gln Tyr Lys Ala Leu Pro Val Val Leu Glu Asn Ala
50 55 60
Arg Ile Leu Lys Asn Cys Val Asp Ala Lys Met Thr Glu Glu Asp Lys
65 70 75 80
20 Glu Asn Ala Leu Ser Leu Leu Asp Lys Ile Tyr Thr Ser Pro Leu Cys
85 90 95

(2) INFORMATION FOR SEQ ID NO:5:

25 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 476 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
30 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

35 (ix) FEATURE:
(A) NAME/KEY: CDS
(B) LOCATION: 1..335

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

40 T GAC ACG ATG AGG GGG GCA CTG CTT GTG CTG GCA TTG CTG GTG ACC
46 Asp Thr Met Arg Gly Ala Leu Leu Val Leu Ala Leu Leu Val Thr
1 5 10 15
45 CAA GCG CTG GGC GTC AAG ATG GCG GAA ACT TGC CCC ATT TTT TAT GAC
94 Gln Ala Leu Gly Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp
20 25 30
50 GTC TTT TTT GCG GTG GCC AAT GGA AAT GAA TTA CTG TTG GAC TTG TCC
142 Val Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser
35 40 45
55 CTC ACA AAA GTC AAT GCT ACT GAA CCA GAG AGA ACA GCC ATG AAA AAA
190 Leu Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys
50 55 60
60 ATC CAG GAT TGC TAC GTG GAG AAC GGA CTC ATA TCC AGG GTC TTG GAT
238 Ile Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp
65 70 75
65 GGA CTA GTC ATG ACA ACC ATC AGC TCC AGC AAA GAT TGC ATG GGT GAA
286 Gly Leu Val Met Thr Thr Ile Ser Ser Ser Lys Asp Cys Met Gly Glu

80	85	90	95
GCA GTT CAG AAC ACC GTC GAA GAT CTC AAG CTG AAC ACT TTG GGG AGA			
334			
5	Ala Val Gln Asn Thr Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg		
	100	105	110
TGAATCTTG CCACTGATGC CCCTTCTGAG CCCCATCCTC CTGCCCTGTT CTTTACACCT			
394			
10	AAAGCTGGAA TCCAGACACC TGTCCCTCACCC TAATTCACTC TCAATCAGGC TGACTAGAAT		
	454		
15	AAAATAACTG CATCTTAAAA AA		
	476		

(2) INFORMATION FOR SEQ ID NO:6:

20	(i) SEQUENCE CHARACTERISTICS:		
	(A) LENGTH: 111 amino acids		
	(B) TYPE: amino acid		
	(D) TOPOLOGY: linear		
25	(ii) MOLECULE TYPE: protein		
	(xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:		
30	Asp Thr Met Arg Gly Ala Leu Leu Val Leu Ala Leu Leu Val Thr Gln		
	1	5	10
	15		
	Ala Leu Gly Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val		
	20	25	30
35	Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu		
	35	40	45
	45		
	Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile		
	50	55	60
40	Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly		
	65	70	75
	80		
45	Leu Val Met Thr Thr Ile Ser Ser Ser Lys Asp Cys Met Gly Glu Ala		
	85	90	95

Val Gln Asn Thr Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg
100 105 110

5 (2) INFORMATION FOR SEQ ID NO:7:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 469 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
10 (D) TOPOLOGY: linear

15 (ii) MOLECULE TYPE: cDNA

15 (ix) FEATURE:

- (A) NAME/KEY: CDS
(B) LOCATION: 1..327

20 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

GAC ACG ATG AGG GGG GCA CTG CTT GTG CTG GCA TTG CTG GTG ACC CAA
48 Asp Thr Met Arg Gly Ala Leu Leu Val Leu Ala Leu Leu Val Thr Gln
25 1 5 10 15

GCG CTG GGC GTC AAG ATG GCG GAG ACG TGC CCC ATT TTT TAT GAC GTC
96 Ala Leu Gly Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val
30 20 25 30

TTT TTT GCG GTG GCC AAT GGA AAT GAA TTA CTG TTG GAC TTG TCC CTC
144 Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu
35 35 40 45

ACA AAA GTC AAT GCT ACT GAA CCA GAG AGA ACA GCC ATG AAA AAA ATC
192 Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile
40 50 55 60

CAG GAT TGC TAC GTG GAG AAC GGA CTC ATA TCC AGG GTC TTG GAT GGA
240 Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly
45 65 70 75 80

CTA GTC ATG ATA GCC ATC AAC GAA TAT TGC ATG GGT GAA GCA GTT CAG
288 Leu Val Met Ile Ala Ile Asn Glu Tyr Cys Met Gly Glu Ala Val Gln
50 85 90 95

AAC ACC GTA GAA GAT CTC AAG CTG AAC ACT TTG GGG AGA TGAATCTTG
337 Asn Thr Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg
55 100 105

CCACTGATGC CCCTTCTGAG CCCCCATCCTC CTGTCCTGTT CTTTACACCT AAAGCTGGAA
397

60 TCCAGACACC TGTCCTCACC TAATTCACTC TCAATCAGGC TGACTAGAAT AAAATAACTG
457

CATCTTAAAA AA
469

65 (2) INFORMATION FOR SEQ ID NO:8:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 109 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

5

- (ii) MOLECULE TYPE: protein

- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

10 Asp Thr Met Arg Gly Ala Leu Leu Val Leu Ala Leu Leu Val Thr Gln
1 5 10 15

Ala Leu Gly Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val
20 25 30

15 Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu
35 40 45

20 Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile
50 55 60

Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly
65 70 75 80

25 Leu Val Met Ile Ala Ile Asn Glu Tyr Cys Met Gly Glu Ala Val Gln
85 90 95

Asn Thr Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg
100 105

30

- (2) INFORMATION FOR SEQ ID NO:9:

- 35 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 465 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

- 40 (ii) MOLECULE TYPE: cDNA

- 45 (ix) FEATURE:
(A) NAME/KEY: CDS
(B) LOCATION: 1..291

- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

50 GAC ACG ATG AGG GGG GCA CTG CTT GTG CTG GCA TTG CTG GTG ACC CAA
48
Asp Thr Met Arg Gly Ala Leu Leu Val Leu Ala Leu Leu Val Thr Gln
1 5 10 15

55 GCG CTG GGC GTC AAG ATG GCG GAG ACG TGC CCC ATT TTT TAT GAC GTC
96
Ala Leu Gly Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val
20 25 30

TTT TTT GCG GTG GCC AAT GGA AAT GAA TTA CTG TTG GAC TTG TCC CTC
144
Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu
35 40 45

5 ACA AAA GTC AAT GCT ACT GAA CCA GAG AGA ACA GCC ATG AAA AAA ATC
192
Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile
50 55 60

10 CAG GAT TGC TAC GTG GAG AAC GGA CTC ATA TCC AGG GTC TTG GAT GGA
240
Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly
65 70 75 80

15 CTA GCC ATG CCA TCA ACG AAT ATT GCA TGG GTG AAG CAG TTC AGA ACA
288
Leu Ala Met Pro Ser Thr Asn Ile Ala Trp Val Lys Gln Phe Arg Thr
85 90 95

20 CCG TAGAACATCT CAAGCTAAC ACTTTGGGGA GATGAATCTT TGCCACTGAT
341
Pro

25 GCCCCTTCTG AGCCCCATCC TCCTGTCTG TTCTTTACAC CTAAAGCTGG AATCCAGACA
401

30 CCTGTCTCA CCTAATTAC TCTCAATCAG GCTGACTAGA ATAAAATAAC TGCATCTTAA
461

35 **AAAA**
465

(2) INFORMATION FOR SEQ ID NO:10:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 97 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

Asp Thr Met Arg Gly Ala Leu Leu Val Leu Ala Leu Leu Val Thr Gln
1 5 10 15

Ala Leu Gly Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val
20 25 30

Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu
35 40 45

55 Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile
50 55 60

Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly
65 70 75 80

Leu Ala Met Pro Ser Thr Asn Ile Ala Trp Val Lys Gln Phe Arg Thr
85 90 95

65 Pro

(2) INFORMATION FOR SEQ ID NO:11:

(i) SEQUENCE CHARACTERISTICS:
5 (A) LENGTH: 94 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

10 (v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:11:

15 Cys Ile Met His Gly Ala Arg Val Leu Val Leu Leu Trp Ala Ala Leu
-20 -15 -10

Leu Leu Ile Trp Gly Gly Asn Cys Glu Ile Cys Pro Ala Val Lys Arg
20 -5 -1 1 5

Asp Val Asp Leu Phe Leu Thr Gly Thr Pro Asp Glu Tyr Val Glu Gln
10 15 20

Val Ala Gln Tyr Lys Ala Leu Pro Val Val Leu Glu Asn Ala Arg Ile
25 30 35

Leu Lys Asn Cys Val Asp Ala Lys Met Thr Glu Glu Asp Lys Glu Asn
40 45 50 55

Ala Leu Ser Leu Leu Asp Lys Ile Tyr Thr Ser Pro Leu Cys
30 60 65

(2) INFORMATION FOR SEQ ID NO:12:

35 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 96 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

40 (ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

45 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:12:

Ala Trp Arg Cys Ser Trp Lys Arg Met Leu Asp Ala Ala Leu Pro Pro
50 -25 -20 -15

Cys Pro Thr Asx Ala Ala Thr Ala Asp Cys Glu Ile Cys Pro Ala Val
-10 -5 -1 1 5

Lys Arg Asp Val Asp Leu Phe Leu Thr Gly Thr Pro Asp Glu Tyr Val
55 10 15 20

Glu Gln Val Ala Gln Tyr Lys Ala Leu Pro Val Val Leu Glu Asn Ala
25 30 35

Arg Ile Leu Lys Asn Cys Val Asp Ala Lys Met Thr Glu Glu Asp Lys
60 40 45 50

Glu Asn Ala Leu Ser Leu Leu Asp Lys Ile Tyr Thr Ser Pro Leu Cys
65 60 65 70

65 (2) INFORMATION FOR SEQ ID NO:13:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 111 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

5 (ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

10 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:13:

Asp Thr Met Arg Gly Ala Leu Leu Val Leu Ala Leu Leu Val Thr Gln
-15 -10 -5

15 Ala Leu Gly Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val
-1 1 5 10

20 Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu
15 20 25

Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile
30 35 40

25 Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly
45 50 55 60

Leu Val Met Thr Thr Ile Ser Ser Ser Lys Asp Cys Met Gly Glu Ala
65 70 75

30 Val Gln Asn Thr Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg
80 85 90

35 (2) INFORMATION FOR SEQ ID NO:14:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 90 amino acids
(B) TYPE: amino acid
40 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

45 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:14:

50 Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val Phe Phe
1 5 10 15

55 Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu Thr Lys
20 25 30

55 Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile Gln Asp
35 40 45

60 Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly Leu Val
50 55 60

65 Met Ile Ala Ile Asn Glu Tyr Cys Met Gly Glu Ala Val Gln Asn Thr
65 70 75

65 Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg
80 85 90

(2) INFORMATION FOR SEQ ID NO:15:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:16:

5 Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val Phe Phe Ala
 1 5 10 15

10 Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu Thr Lys Val
 20 25 30

15 Xaa Ala Thr Glu Pro Glu Arg Thr Ala Met Lys Lys Ile Gln Asp Cys
 35 40 45

20 Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly Leu Val Met
 50 55 60

25 Xaa Xaa Ile Xaa Xaa Lys Asp Cys Met Gly Glu Ala Val Gln Asn Xaa
 65 70 75 80

30 Xaa Glu

(2) INFORMATION FOR SEQ ID NO:17:

35 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 27 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

40 (ii) MOLECULE TYPE: peptide
 (v) FRAGMENT TYPE: internal

45 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:17:

50 Lys Arg Asp Val Asp Leu Phe Leu Thr Gly Thr Pro Asp Glu Tyr Val
 1 5 10 15

55 Glu Gln Val Ala Gln Tyr Lys Ala Leu Pro Val
 20 25

(2) INFORMATION FOR SEQ ID NO:18:

55 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 27 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

60 (ii) MOLECULE TYPE: peptide
 (v) FRAGMENT TYPE: internal

65 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:18:

70 Lys Ala Leu Pro Val Val Leu Glu Asn Ala Arg Ile Leu Lys Asn Cys
 1 5 10 15

75 Val Asp Ala Lys Met Thr Glu Glu Asp Lys Glu
 20 25

80 (2) INFORMATION FOR SEQ ID NO:19:

85 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 26 amino acids

(B) TYPE: amino acid
(D) TOPOLOGY: linear

5 (ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

10 10 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:19:

Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu
1 5 10 15

15

Thr Lys Val Asn Ala Thr Glu Pro Glu Arg
20 25

5 (2) INFORMATION FOR SEQ ID NO:20:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 19 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

10 (ii) MOLECULE TYPE: peptide
(v) FRAGMENT TYPE: internal

15 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:20:

20 Glu Glu Asp Lys Glu Asn Ala Leu Ser Leu Leu Asp Lys Ile Tyr Thr
1 5 10 15
Ser Pro Leu

25 (2) INFORMATION FOR SEQ ID NO:21:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 19 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

30 (ii) MOLECULE TYPE: peptide
(v) FRAGMENT TYPE: internal

35 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:21:

40 Met Gly Glu Ala Val Gln Asn Thr Val Glu Asp Leu Lys Leu Asn Thr
1 5 10 15
Leu Gly Arg

45 (2) INFORMATION FOR SEQ ID NO:22:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 16 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

50 (ii) MOLECULE TYPE: peptide
(v) FRAGMENT TYPE: internal

60 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:22:

65 Glu Glu Asp Lys Glu Asn Ala Leu Ser Leu Leu Asp Lys Ile Tyr
1 5 10 15
Thr

(2) INFORMATION FOR SEQ ID NO:23:

5 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 14 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

10 (ii) MOLECULE TYPE: peptide

10 (v) FRAGMENT TYPE: internal

15 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:23:

15 Asn Ala Leu Ser Leu Leu Asp Lys Ile Tyr Thr Ser Pro Leu
1 5 10

20 (2) INFORMATION FOR SEQ ID NO:24:

25 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 17 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

25 (ii) MOLECULE TYPE: peptide

30 (v) FRAGMENT TYPE: internal

35 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:24:

35 Phe Tyr Asp Val Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu Leu
1 5 10 15
Asp

40 (2) INFORMATION FOR SEQ ID NO:25:

45 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 18 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

50 (ii) MOLECULE TYPE: peptide

50 (v) FRAGMENT TYPE: internal

55 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:25:

55 Asn Gly Asn Glu Leu Leu Leu Asp Leu Ser Leu Thr Lys Val Asn Ala
1 5 10 15
60 Thr Glu

65 (2) INFORMATION FOR SEQ ID NO:26:

65 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 18 amino acids
 (B) TYPE: amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

5 (v) FRAGMENT TYPE: internal

10 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:26:

Ser Leu Thr Lys Val Asn Ala Thr Glu Pro Glu Arg Thr Ala Met Lys
1 5 10 15

15 Lys Ile

(2) INFORMATION FOR SEQ ID NO:27:

20 (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 17 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

25 (ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

30 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:27:

Glu Arg Thr Ala Met Lys Lys Ile Gln Asp Cys Tyr Val Glu Asn Gly
1 5 10 15

35 Leu

40 (2) INFORMATION FOR SEQ ID NO:28:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 18 amino acids
(B) TYPE: amino acid
45 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

50 (v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:28:

Gln Asp Cys Tyr Val Glu Asn Gly Leu Ile Ser Arg Val Leu Asp Gly
1 5 10 15

Leu Val

60

(2) INFORMATION FOR SEQ ID NO:29:

65 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 20 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

5

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:29:

Ile Ser Arg Val Leu Asp Gly Leu Val Met Thr Thr Ile Ser Ser Ser
1 5 10 15
Lys Asp Cys Met
20

15 (2) INFORMATION FOR SEQ ID NO:30:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

20

(ii) MOLECULE TYPE: peptide

25

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:30:

Ile Ser Arg Val Leu Asp Gly Leu Val Met Ile Ala Ile Asn Glu Asp
1 5 10 15
Cys Met

35

(2) INFORMATION FOR SEQ ID NO:31:

40

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 30 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

45

(ii) MOLECULE TYPE: peptide

50

(v) FRAGMENT TYPE: internal

55

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:31:

Met Thr Thr Ile Ser Ser Ser Lys Asp Cys Met Gly Glu Ala Val Gln
1 5 10 15

60

Asn Thr Glu Val Glu Leu Asp Lys Leu Asn Thr Leu Gly Phe
20 25 30

(2) INFORMATION FOR SEQ ID NO:32:

65

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 28 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

5 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:32:

Met Ile Ala Ile Asn Glu Asp Cys Met Gly Glu Ala Val Gln Asn Thr
1 5 10 15
Glu Val Glu Leu Asp Lys Leu Asn Thr Leu Gly Phe
10 20 25

(2) INFORMATION FOR SEQ ID NO:33:

- 15 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 24 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

20 (ii) MOLECULE TYPE: cDNA

25 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:33:

TATCGATGAA ATTTGYCCWG CWGT
24

30 (2) INFORMATION FOR SEQ ID NO:34:

- 35 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 19 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

40 (ii) MOLECULE TYPE: cDNA

45 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:34:

GCTCGAGRTC YTCYTCWGT
45 19

50 (2) INFORMATION FOR SEQ ID NO:35:

- 55 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 31 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

55 (ii) MOLECULE TYPE: cDNA

60 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:35:

GGAATTCAATC GATGTGAAGA GGGATCTATT C
60 31

65 (2) INFORMATION FOR SEQ ID NO:36:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 32 base pairs

- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

5 (ii) MOLECULE TYPE: cDNA

10 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:36:

GGATCGATGA ATTCTATTCC TGACGGAAC CC
32

15 (2) INFORMATION FOR SEQ ID NO:37:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 20 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

25 (ii) MOLECULE TYPE: cDNA

25

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:37:

30 GGATTCTCTA GACTGCAGGT
20

(2) INFORMATION FOR SEQ ID NO:38:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 21 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

40 (ii) MOLECULE TYPE: cDNA

45 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:38:

GGAATTCTCT AGACTGCAGG T
21

50 (2) INFORMATION FOR SEQ ID NO:39:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 20 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

60 (ii) MOLECULE TYPE: cDNA

60

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:39:

65 GAYGARTAYG THGARCARGT
20

(2) INFORMATION FOR SEQ ID NO:40:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 27 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

10

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:40:

CGGAATTCAA RATGGCNGAR ACDTGYC
27

(2) INFORMATION FOR SEO ID NO:41:

20 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 33 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:41:

CGGGCTGCAG TARCARTCYT GNATYTTYTT CAT
33

35

(2) INFORMATION FOR SEQ ID NO:42:

40 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 8 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

45 (ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

50

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:43:

Met Lys Lys Ile Gln Asp Cys Tyr
1 5

55

(2) INFORMATION FOR SEO ID NO: 43:

60 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 31 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

65 (ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:43:

GGATCGATGA ATTCCGTGGC CAATGGAAAT G
31

5

(2) INFORMATION FOR SEQ ID NO:44:

- 10 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 21 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

15 (ii) MOLECULE TYPE: cDNA

20 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:44:

ATTACTGTTG GACTTGTCCC T
21

25 (2) INFORMATION FOR SEQ ID NO:45:

(i) SEQUENCE CHARACTERISTICS:

- 30 (A) LENGTH: 6 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

35 (ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

40 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:45:

Leu Leu Leu Asp Leu Ser
1 5

45 (2) INFORMATION FOR SEQ ID NO:46:

- 50 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 30 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

55 (ii) MOLECULE TYPE: cDNA

55

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:46:

60 GGGTCTAGAG GTACCGTCCG ATCGATCATT
30

(2) INFORMATION FOR SEQ ID NO:47:

- 65 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 13 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

5

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:47:

10 AATGATCGAT GCT
13

(2) INFORMATION FOR SEQ ID NO:48:

15 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 20 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

20

(ii) MOLECULE TYPE: cDNA

25

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:48:

GGGTCTAGAG GTACCGTCCG
20
30

(2) INFORMATION FOR SEQ ID NO:49:

35 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 35 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

40

(ii) MOLECULE TYPE: cDNA

45

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:49:

CGGGCTCGAG CTGCAGCTGT TCTCTCTGGT TCAGT
35

50

(2) INFORMATION FOR SEQ ID NO:50:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 6 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

60 (v) FRAGMENT TYPE: internal

65 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:50:

Thr Glu Pro Glu Arg Thr
1 5

(2) INFORMATION FOR SEQ ID NO:51:

- 5 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 29 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

10 (ii) MOLECULE TYPE: cDNA

15 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:51:

29 GGGCTGCAGA TTCTAGTCAG CCTGATTGA

20 (2) INFORMATION FOR SEQ ID NO:52:

- 25 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 33 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

30 (ii) MOLECULE TYPE: cDNA

35 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:52:

33 GGGCTCGAGC TGCAGTTCTT CAGTATTCTG GCA

40 (2) INFORMATION FOR SEQ ID NO:53:

- 45 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 6 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

50 (ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

55 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:53:

Ala Arg Ile Leu Lys Asn
1 5

60 (2) INFORMATION FOR SEQ ID NO:54:

- 65 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:54:

5 Glu Ile Thr Pro Ala Val Lys Arg Asp Val Asp Leu Phe Leu Thr Gly
1 5 10 15

Thr

10

(2) INFORMATION FOR SEQ ID NO:55:

15 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

20 (ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

25

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:55:

Asp Val Asp Leu Phe Leu Thr Gly Thr Pro Asp Glu Tyr Val Glu Gln
1 5 10 15

30 Val

35 (2) INFORMATION FOR SEQ ID NO:56:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 19 amino acids
(B) TYPE: amino acid
40 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

45 (v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:56:

50 Asn Ala Arg Ile Leu Lys Asn Cys Val Asp Ala Lys Met Thr Glu Glu
1 5 10 15

Asp Lys Glu

55

(2) INFORMATION FOR SEQ ID NO:57:

60 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 27 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

65 (ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:57:

5 Leu Leu Leu Asp Leu Ser Leu Thr Lys Val Asn Ala Thr Glu Pro Glu
 1 5 10 15
 Arg Thr Ala Met Lys Lys Ile Asp Gln Asp Cys
 10 20 25

(2) INFORMATION FOR SEQ ID NO:58:

15 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 27 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

20 (ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:58:

GTCCACGGAC ACAAGTGC GA TATCACC
27

30 (2) INFORMATION FOR SEQ ID NO:59:

35 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 27 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

40 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:59:

GTTGGCTTCC TTCACAGGAC AGGAATT
27

45

(2) INFORMATION FOR SEQ ID NO:60:

50 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 18 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

60 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 60:

Val Lys Met Ala Glu Thr Cys Pro Ile Phe Tyr Asp Val Phe Phe Ala
1 5 10 15

65 Val Ala

(2) INFORMATION FOR SEQ ID NO:61:

5 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 27 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

10 (ix) FEATURE:
 (A) NAME/KEY: CDS
 (B) LOCATION: 10..27

15 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 61:

GGGGGATCC AAA GCT CTG CCG GTT GTT
 27
 20 Lys Ala Leu Pro Val Val
 1 5

(2) INFORMATION FOR SEO ID NO:62:

25 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 6 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 62:

35 Lys Ala Leu Pro Val Val
1 5

(2) INFORMATION FOR SEQ ID NO:63:

40 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 90 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

50 (ix) FEATURE:
 (A) NAME/KEY: CDS
 (B) LOCATION: 10..90

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:63:

'GGGGGATCC AAA GCT CTG CCG GTT GTT CTG GAA AAC AAC GCT CGT ATC CTG
48

Lys	Ala	Leu	Pro	Val	Val	Leu	Glu	Asn	Ala	Arg	Ile	Leu
1				5						10		

```

AAA AAC TGC GTT GAC GCT AAA ATG ACC GAA GAA GAC AAA GAA
90
Lys Asn Cys Val Asp Ala Lys Met Thr Glu Glu Asp Lys Glu
15   20   25

```

(2) INFORMATION FOR GRS IN RS-64

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 27 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

5

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:64:

Lys Ala Leu Pro Val Val Leu Glu Asn Ala Arg Ile Leu Lys Asn Cys
1 5 10 15

5 Val Asp Ala Lys Met Thr Glu Glu Asp Lys Glu
20 25

(2) INFORMATION FOR SEQ ID NO:65:

10 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 63 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

15 (ii) MOLECULE TYPE: cDNA
(iv) ANTI-SENSE: YES

20 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:65:

25 CAGAGACAGG TCCAGCAGCA GTTCGTTACC GTTAGCAACA GCGAAGAATT CTGGTCTTC
60

TTC
63

30 (2) INFORMATION FOR SEQ ID NO:66:

35 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 21 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(iii) MOLECULE TYPE: peptide

40 (v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:66:

45 Glu Glu Asp Lys Glu Phe Phe Ala Val Ala Asn Gly Asn Glu Leu Leu
1 5 10 15

Leu Asp Leu Ser Leu
20

50 (2) INFORMATION FOR SEQ ID NO:67:

55 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 45 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

60 (iii) MOLECULE TYPE: cDNA

(ix) FEATURE:
(A) NAME/KEY: CDS
(B) LOCATION: 1..45

65 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:67:

CTG GAC CTG TCT CTG ACC AAA GTT AAC GCT ACC GAA CCG GAA CGT
45
Leu Asp Leu Ser Leu Thr Lys Val Asn Ala Thr Glu Pro Glu Arg
1 5 10 15

5

(2) INFORMATION FOR SEQ ID NO:68:

- 10 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 15 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

15 (ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:68:

Leu Asp Leu Ser Leu Thr Lys Val Asn Ala Thr Glu Pro Glu Arg
1 5 10 15

20

(2) INFORMATION FOR SEQ ID NO:69:

- 25 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 54 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

30 (ii) MOLECULE TYPE: cDNA

(iv) ANTI-SENSE: YES

35 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:69:

GTCCGGGGTA CCGGTCAGGA ACAGGTCAAC GTCACGTTA CGTTCCGGTT CGGT
54

40 (2) INFORMATION FOR SEQ ID NO:70:

- 45 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 18 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

50 (v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:70:

55 Thr Glu Pro Glu Arg Lys Arg Asp Val Asp Leu Phe Leu Thr Gly Thr
1 5 10 15

Pro Asp

60

(2) INFORMATION FOR SEQ ID NO:71:

- 65 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 89 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

5 (ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 1..63

10 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:71:

ACC GGT ACC CCG GAC GAA TAC GTT GAA CAG GTT GCT CAG TAC AAA GCT
48 Thr Gly Thr Pro Asp Glu Tyr Val Glu Gln Val Ala Gln Tyr Lys Ala
15 1 5 10 15

CTG CCG GTT TAG TAGTCTAGAC TGCAGAACCT TGGATCCCC
89 Leu Pro Val

20

(2) INFORMATION FOR SEQ ID NO:72:

25 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 19 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

30 (ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:72:

35 Thr Gly Thr Pro Asp Glu Tyr Val Glu Gln Val Ala Gln Tyr Lys Ala
1 5 10 15

Leu Pro Val

40

(2) INFORMATION FOR SEQ ID NO:73:

45 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 44 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

50 (ii) MOLECULE TYPE: cDNA

(iv) ANTI-SENSE: YES

55 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:73:

GGGGATCAA GCTTCTGCAG TCTAGACTAC TAAACCGGCA GAGC
44

60 (2) INFORMATION FOR SEQ ID NO:74:

65 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 4 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

5 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:74:

Ala Leu Pro Val
1

10 (2) INFORMATION FOR SEQ ID NO:75:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 41 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

20

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 9..41

25

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:75:

30 GGGGATCC GAA GAA GAC AAA GAA AAC GCT CTG TCT CTG CTG
41 Glu Glu Asp Lys Glu Asn Ala Leu Ser Leu Leu
1 5 10

35 (2) INFORMATION FOR SEQ ID NO:76:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 11 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

45

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:76:

50 Glu Glu Asp Lys Glu Asn Ala Leu Ser Leu Leu
1 5 10

50 (2) INFORMATION FOR SEQ ID NO:77:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 60 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

60

(iv) ANTI-SENSE: YES

65 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:77:

TTCCAGAACCA ACCGGCAGAG CTTTCAGCGG AGAGGGTAG ATTTTGTCGA GCAGAGACAG
60

(2) INFORMATION FOR SEQ ID NO:78:

5 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 20 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

10 (ii) MOLECULE TYPE: peptide
 (v) FRAGMENT TYPE: internal
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:78:
15 Leu Ser Leu Leu Asp Lys Ile Tyr Thr Ser Pro Leu Lys Ala Leu Pro
 1 5 10 15
 Val Val Leu Glu
20 20

(2) INFORMATION FOR SEQ ID NO:79:

25 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 54 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

30 (ii) MOLECULE TYPE: cDNA
 (iv) ANTI-SENSE: YES
35 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:79:
40 TTCAACGGTG TTCTGAACAG CTTCACCCAT AACCGGCAGA GCTTTGTACT GAGC
 54

(2) INFORMATION FOR SEQ ID NO:80:

45 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 18 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

50 (ii) MOLECULE TYPE: peptide
 (v) FRAGMENT TYPE: internal

55 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:80:

Ala Gln Tyr Lys Ala Leu Pro Val Met Gly Glu Ala Val Gln Asn Thr
1 5 10 15
60 Val Glu

(2) INFORMATION FOR SEQ ID NO:81:

65 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 65 base pairs
 (B) TYPE: nucleic acid

(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

5 (ii) MOLECULE TYPE: cDNA

10 (ix) FEATURE:

(A) NAME/KEY: CDS
(B) LOCATION: 1..45

15 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:81:

CAG AAC ACC GTT GAA GAC CTG AAA CTG AAC ACC CTG GGT CGT TGAATGTAAC

52

Gln Asn Thr Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg

1

5

10

15

20 TGCAGAATT^C CCC

65

(2) INFORMATION FOR SEQ ID NO:82:

25 (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 14 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

30 (ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:82:

Gln Asn Thr Val Glu Asp Leu Lys Leu Asn Thr Leu Gly Arg

35 1

5

10

(2) INFORMATION FOR SEQ ID NO:83:

40 (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 20 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

45 (ii) MOLECULE TYPE: cDNA

50 (ix) FEATURE:

(A) NAME/KEY: CDS
(B) LOCATION: 9..20

55 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:83:

GGGGATCC GAA GAA GAC AAA

20

Glu Glu Asp Lys

1

60

(2) INFORMATION FOR SEQ ID NO:84:

65 (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 4 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:84:

5 Glu Glu Asp Lys
 1

(2) INFORMATION FOR SEQ ID NO:85:

10 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 35 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

15 (ii) MOLECULE TYPE: cDNA
 (iv) ANTI-SENSE: YES

20

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:85:

25 GGGGAATTCT GCAGTTACAT TCATCTCCCC AAAGT
 35

(2) INFORMATION FOR SEQ ID NO:86:

30 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 4 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

35 (ii) MOLECULE TYPE: peptide
 (v) FRAGMENT TYPE: internal

40 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:86:

 1
Thr Leu Gly Arg

45 (2) INFORMATION FOR SEQ ID NO:87:

50 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 6 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

55 (ii) MOLECULE TYPE: peptide
 (v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:87:

60 Leu Val Pro Arg Gly Ser
 1 5

(2) INFORMATION FOR SEQ ID NO:88:

65 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 10 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(v) FRAGMENT TYPE: internal

5

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:88:

10 Met Gly His His His His His Glu Phe
1 5 10

15 (2) INFORMATION FOR SEQ ID NO:89:

15 (i) SEQUENCE CHARACTERISTICS:
20 (A) LENGTH: 6 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

25 (ii) MOLECULE TYPE: cDNA

25 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:89:

GAATTC
6

30 (2) INFORMATION FOR SEQ ID NO:90:

35 (i) SEQUENCE CHARACTERISTICS:
40 (A) LENGTH: 6 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

40 (ii) MOLECULE TYPE: cDNA

45 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:90:

GGATCC
6

(2) INFORMATION FOR SEQ ID NO:91:

50 (i) SEQUENCE CHARACTERISTICS:
55 (A) LENGTH: 14 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

55 (ii) MOLECULE TYPE: peptide

60 (v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:91:

65 Met Gly His His His His His Leu Val Pro Arg Gly Ser
1 5 10

(2) INFORMATION FOR SEQ ID NO:92:

5 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 7 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

10 (ii) MOLECULE TYPE: peptide

15 (v) FRAGMENT TYPE: internal

15 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:92:

Lys Met Ala Glu Thr Cys Pro
1 5

20 (2) INFORMATION FOR SEQ ID NO:93:

25 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 5 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

25 (ii) MOLECULE TYPE: peptide

30 (v) FRAGMENT TYPE: internal

35 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:93:

Val Ala Asn Gly Asn
1 5